distant and irregular papillae, of which the largest are placed more anteriorly, while the posterior ones are indistinct. A black streak of pigment is present. Also the male has this black pigment, but the papillae are obsolete.

Posterior margins of palpi connected at base. Inner lamina of inner gills entirely connected with abdominal sac. Marsupium with from 12 to 20 ovisacs. Edge of marsupium with black pigment. Holes at the edge were observed in discharging females.

Glochidia subspatulate, higher than long. Length: 0.21, height: 0.27 mm.

Except the black pigment on mantle edge in the posterior region, and on the edge of the marsupium, the color of the soft parts is whitish.

This species is closely allied to *E. vanuxemensis*. The papillae in front of the branchial are smaller and less crowded, and the black pigment is not so intense.

(*To be concluded*)

NOTES ON OLIVA.

BY E. G. VANATTA.

The Academy of Natural Sciences of Philadelphia having purchased the John Ford Collection of *Oliva*, the following notes may be useful to those interested in the genus.

Oliva peruniana Lam.

The typical form is illustrated in Reeve's Conch. Icon. vol. vi, pl. 9, f. 14 *d;* Tryon's Man. Conch. vol. v, pl. 18, f. 58.

Var. *fulgurata* Mart., Rve. Conch. Icon. pl. 9, f. 14 *b.;* Tryon M. C. pl. 18, f. 56.

Var *livida* Johns.

The types are pale lilac with ivory-yellow streaks, A. N. S. P. Coll. No. 111726. Alt. 40, diam. 20 mm.

Habitat—unknown.

Nautilus vol. 24, p. 122; Tryon M. C. pl. 18, f. 55; Rve. C. I. pl. 9, f. 14 *a*.

Var. *castanea* "Ford" Johns.

The types are in the A. N. S. P. Coll. No. 111603 from Peru. Alt. 43.5, diam. 22 mm.

NAUTILUS vol. 24, p. 122 ; Rve. C. I. pl. 9, f. 14 *c;* Tryon M. C. pl. 18, f. 57.

Var. *subcastanea* n. var.

This form is brown with zigzag darker brown lines. It is similar to *castanea* in color but with streaks somewhat like *fulgurata*. Alt. 41.5, diam. 21.5 mm.

The types are A. N. S. P. Coll. No. 111688 from Peru. This seems to be the form figured by Reeve. C. I. pl. 9, f. 14 *e*.

OLIVA ANNULATA Gmel.

Chenu Ill. Conch. pl. 16, f. 6 ; Sby. Thes. Conch. 5 (332), fig. 60.

Var. *amethystina* Bolt. Tryon M. C. pl. 19, f. 64, 66.

Var. *mantichora* Ducl. Tryon M. C. pl. 19, f. 65.

OLIVA BULBOSA Bolt.

Tryon, M. C. pl. 20, f. 71, 74.

Var. *tuberosa* Bolt. Tryon M. C. pl. 19, f. 68, 69.

Var. *inflata* Lam. Tryon M. C. pl. 20, f. 73.

The types of *ovum-ralli* Ford were not found, but A. N. S. P. Coll. No. 14709 is part of the original lot presented by Mr. J. Ford.

Var. *fabagina* Lam. Tryon. M. C. pl. 19, f. 70, pl. 20, f. 72.

Var. *immaculata* n. n.

Shell pure white. Alt. 45.5, diam. 25 mm. the types are A. N. S. P. Coll. No. 111630 from the Indo-Pacific. It is *Oliva bulbosa alba* Johns. (not Lam.) Nautilus vol. 28, p. 101 ; Thes. Conch. vol. IV, pl. 13 (340), f. 191.

OLIVA TIGRINA Lam.

Tryon. M. C. pl. 20, f. 77, 80.

Var. *fallax* Johns. The types are A. N. S. P. Coll. No. 111575 from Ceylon. Alt. 44.5, diam. 24 mm. Nautilus vol. 24, p. 65 ; t. c. vol. 28, p. 100 ; Tryon M. C. pl. 20, f. 78.

OLIVA TRICOLOR Lam.

Tryon M. C. pl. 21, f. 86.

Var. *philantha* Ducl. Tryon. M. C. pl. 21, f. 87.

Oliva variegata Bolt.

Tryon. M. C. pl. 23, f. 27.

Var. *reticulata* Bolt. Tryon. M. C. pl. 23, f. 28.

Oliva oliva L.

Tryon M. C. pl. 1, f. 5 ; pl. 23, f. 24.

Var. *fenestrata* Bolt., Tryon M. C. pl. 23, f. 23.

Var. *fulminans* Lam., Tryon M. C. pl. 23, f. 22.

Var. *sepulturalis* Lam., Tryon M. C. pl. 23, f. 21.

Var. *macleaya* Ducl., Tryon M. C. pl. 13, f. 26.

Oliva sericea Bolt.

Tryon M. C. pl. 27, f. 59, 60.

Var. *tremulina* Lam., Tryon M. C. pl. 25, f. 48.

Var. *pica* Lam. Tryon M. C. pl. 26, f. 51.

Var. *tenebrosa* Marr., Tryon M. C. pl. 25, f. 49.

Var. *porphyritica* Marr., Tryon M. C. pl. 26, f. 53.

Var. *sylvia* Ducl., Tryon M. C. pl. 27, f. 57.

Var. *zeilanica* Lam., Tryon M. C. pl. 24, f. 32.

Var. *ornata* Marr., Tryon M. C. pl. 24, f. 31 ; pl. 25, f. 45.

Form *lignaria* Marr., Tryon M. C. pl. 25, f. 44.

Var. *marrati* Johns.

The types are A. N. S. P. Coll. No. 111862, from the Indo-Pacific. Alt. 71.5, diam. 30 mm. Nautilus vol. 24, p.51 : t. c. vol. 28, p. 99 ; Sby. Thes. Conch. pl. 7 (334), f. 109.

Var. *cryptospira* Ford.

The type is A. N. S. P. Coll. No. 111611 from Mauritius. Alt. 55.5, diam. 24 mm., P. A. N. S 1891 p. 99.; Nautilus vol. 28, p. 99 ; Chenu. Ill. Conch. pl. 30, f. 11.

Var. *fordi* Johns.

The type is A. N. S. P. Coll. No. 111612 from (Mauritius). Alt. 44, diam. 17 mm., Nautilus vol. 24, p. 51 ; t. c. vol. 28, p. 98 : Sby. Thes. Conch. pl. 9 (336), f. 126 ; Chenu. Ill. Conch. pl. 30, f. 12.

Var. *albescens* Johns.

The type is A. N. S. P. Coll. No. 111753 from Baker Island, S. Pacific. Alt. 42, diam. 14.3 mm. Nautilus vol. 28, p. 99.

OLIVA SPICATA Bolt.

Tryon M. C. pl. 27, f. 62.

Var. *hemphilli* "Ford" Johns.

The types are A. N. S. Coll. No. 111697 from San Ignacio Lagoon, Lower California. Alt. 53.5, diam. 23 mm. Nautilus vol. 24, p. 122 ; t. c. vol. 28, p. 115.

Var. *subangulata* Phil. Tryon M. C. pl. 28, f. 65.

Var. *oniska* Ducl.

The types of *O. perfecta* Johns. are A. N. S. P. Coll. No. 111729 from West Coast Central America. Alt. 58.5, diam. 25 mm. Nautilus vol. 24, p. 122 ; t. c. vol. 28, p. 116 ; Rve. C. I. pl. 10, f. 16 *g* ; Tryon M. C. pl. 27, f. 61 ; Chenu Ill. Conch. pl. 32, f. 9.

Var. *pindarina* Ducl. Tryon, M. C. pl. 28, f. 64.

Var. *maria* Ducr. This is the very light colored form much like var. *venulata*. Tryon M. C. pl. 29, f. 78 ; Chenu. Ill. Conch. pl. 33, f. 11.

Var. *ustulata* Lam. Tryon M. C. pl. 28, f. 66.

Var. *graphica* Marr. Tryon M. C. pl. 28, f. 63.

Var. *violacea* Marr. Tryon M. C. pl. 28, f. 70.

OLIVA RETICULARIS Lam.

Tryon M. C. pl. 30, f. 90, 91, 94, 95 ; pl. 34, 57.

Var. *formosa* Marr. the small brown form. Tryon M. C. pl. 31, f. 100.

Var. *nivosa* Tryon Marr. Tryon M. C. pl. 31, f. 1.

Var. *bifasciata* Küster. The large brown form. Tryon M. C. pl. 31, f. 99.

var. *olorinella* Ducl.

Tryon. M. C. pl. 31, f. 2.

var. *tisiphona* Ducl.

This is the globose, grayish form of Northern S. America.

Tryon. M. C. pl. 30, f. 93.

OLIVA SAYANA Ravenel.

Tryon. M. C. pl. 31, f. 5.

var. *citrina* Johns.

The types are A. N. S. P. Coll. No. 111642 from Long Key, Florida.

Alt. 48. 5, diam. 19 mm.

NAUTILUS, vol. 24, p. 123 ; t. c. vol. 28, p. 114.

Oliva ispidula L.

var. *candida* Lam. White form.

Tryon. M. C. pl. 33, f. 32, 36.

var. *flaveola* Lam. Yellow form.

Tryon. M. C. pl. 33, f. 40.

var. *tigridella* Ducl. The form with small dark spots.

Tryon. M. C. pl. 33, f. 35.

var. *taeniata* Link. The form with a broad subsutural dark band.

Tryon. M. C. pl. 33, f. 37, 39.

var. *stellata* Ducl. The form with broad brown markings.

Tryon. M. C. pl. 33, f. 42.

var. *gratiosa* n. var.

Shell slender, dark brown, spire elevated, columellar callus cream-white.

Alt. 32.5, diam. 12.5 mm.

The type is A. N. S. P. Coll. No. 111869 from the Philippines. This form may be Chenu Ill. Conch. pl. 8, f. 13 ; Sby. Thes. Conch. pl. 16 (343), f. 252.

var. *algida* n. var.

Shell oblong, bluish white with longitudinal light brown streaks, lip yellowish brown, spire short, columellar callus white, posterior angle of the aperture provided with a brown and white callus.

Alt. 36.5, diam. 18 mm.

The type is A. N. S. P. Coll. No. 14986, habitat unknown, gift of J. S. Phillips. This is probably Reeve's Conch. Icon. pl. 17, f. 34 *i*.

var. *samarensis* Johns.

The types are A. N. S. P. Coll. No. 111759 from Samar Island, Philippine Is. collected by E. L. Moseley.

Alt. 37.5, diam. 14 mm.

Olivella biplicata lapillus n. var.

Shell globose, white, spire short, interior of the aperture cream-colored.

Alt. 24, diam. 14 mm.

The type is A. N. S. P. Coll. No. 111977 from San Pedro, California, collected by Mrs. E. M. Gaylord.

It is the *Olivella biplicata alba* Wlms. (not Marr.). It is figured in Sby. Thes. Conch. IV, pl. 18 (345), f. 290. Some specimens have lilac on the columella.

Olivella gracilis gaylordi Ford.

The types are A. N. S. P. Coll. No. 111804 from the Gulf of California.

Nautilus, vol. 8, p. 104.

Olivella blanesi Ford.

The types are A. N. S. P. Coll. No. 111788 from Cardenas, Cuba. Nautilus vol. 12, p. 66.

Var. *albata* nn.

Shell globose, white, spire elevated. Alt. 7, diam. 3.5 mm.

This is *Olivella blanesi alba* Ford (not Marr.), Nautilus vol. 12, p. 67, from Cardenas, Cuba, collected by Francisco Blanes. The types are A. N. S. P. Coll. No. 111789.

Agaronia gibbosa Born.

Tryon M. C. pl. 36, f. 85, 87.

Var. *aurantia* Johns.

The types are A. N. S. P. Coll. No. 111739 from the Indian Ocean. Alt. 55.5, diam. 28.5 mm. Nautilus vol. 28, p. 103; Tryon M. C. pl. 36, f. 86; Chenu. Ill. Conch. pl. 18, f. b.

NOTES.

Helix pisana Mull., in California.—While in San Diego in July 1914 Mrs. Kate Stephens, Curator of the San Diego Society of Natural History, showed me 4 specimens of a snail that had been found in the garden of Miss Scripp's home at La Jolla. These shells were not like any local snails and she believed them to be European, as some of the plants or bushes in the garden had been imported from Belgium.

This summer Mr. Allyn G. Smith of Redlands informed me that there was colony of *Helix pisana* Mull., at La Jolla and he gave me a set of shells which he had collected in December 1914. Mr. D. L. Emery of National City, has also collected from the same colony and reports them quite plentiful even though he went after them in August and had to dig them out. —E. P. Chace.